US 20210230527A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0230527 A1**

Vunjak-Novakovic et al. (43) **Pub. Date: Jul. 29, 2021**

(54) **HUMAN ORGAN-ON-CHIP MODELS FOR PREDICTIVE SCREENING**

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(21) Appl. No.: **17/159,037**

(22) Filed: **Jan. 26, 2021**

Related U.S. Application Data

(63) Continuation of application No. PCT/US19/43722, filed on Jul. 26, 2019.

(60) Provisional application No. 62/711,221, filed on Jul. 27, 2018.

Publication Classification

(51) **Int. Cl.**

C12M 3/00	(2006.01)
C12M 1/32	(2006.01)
C12M 1/00	(2006.01)
C12M 3/06	(2006.01)

(52) **U.S. Cl.**

CPC ***C12M 21/08*** (2013.01); ***C12M 23/12*** (2013.01); ***C12M 23/16*** (2013.01); ***C12M 29/00*** (2013.01); ***C12M 27/16*** (2013.01); ***C12M 23/44*** (2013.01)

(57) **ABSTRACT**

An integrated modular microphysiological system is provided which includes a two or more chambers and a vascular network which includes at least one channel. The chamber can be configured for culturing a tissue and includes a layer of endothelial cells which forms an endothelial barrier within the well. The endothelial barrier can be in fluid contact with at least one of the at least one channels in the vascular network. The endothelial barrier can also be in fluid contact with a fluid in the chamber.